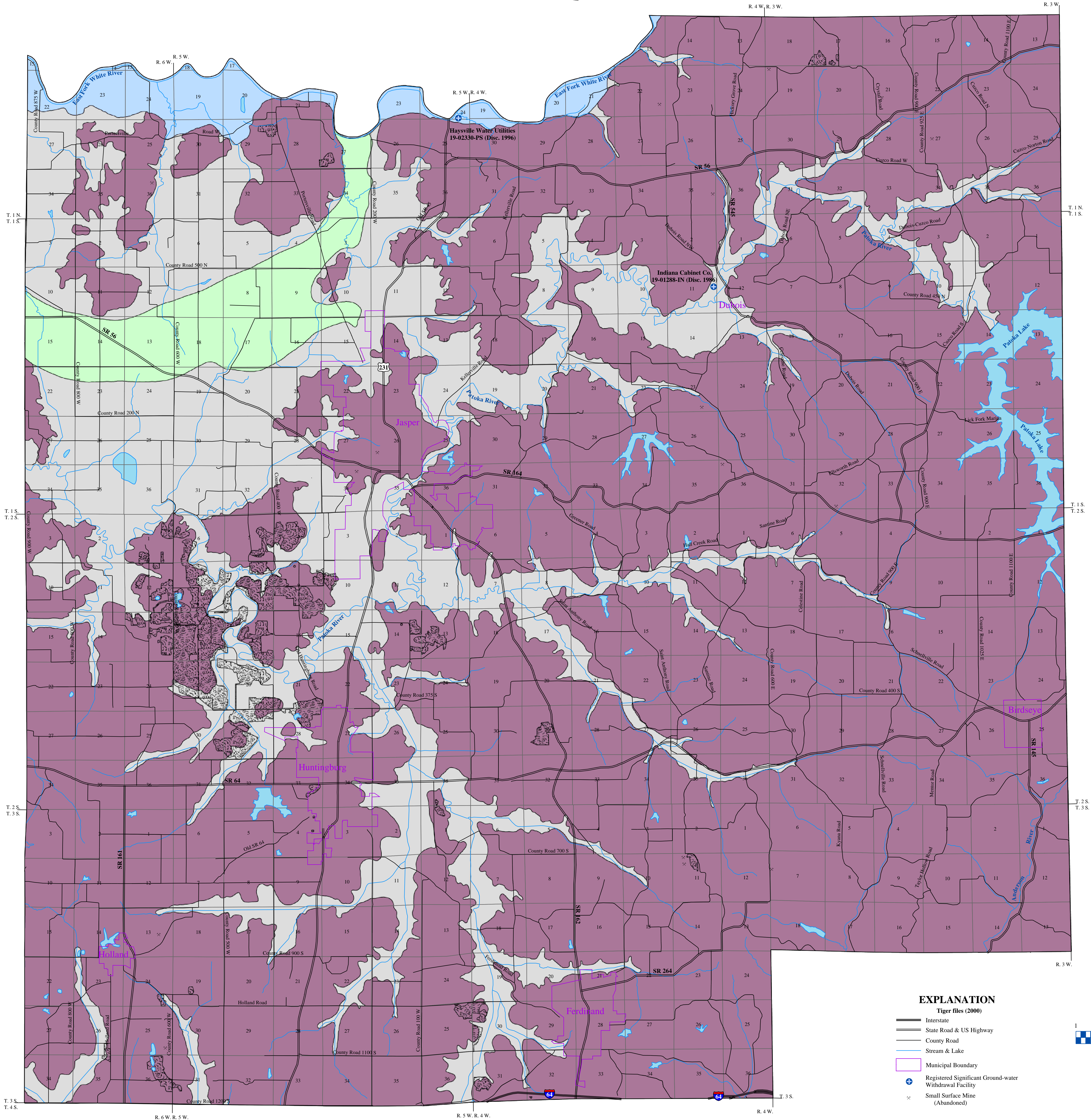


# UNCONSOLIDATED AQUIFER SYSTEMS OF DUBOIS COUNTY, INDIANA



## Unconsolidated Aquifer Systems

Five unconsolidated aquifer systems are mapped in Dubois County. Boundaries are commonly gradational, and individual aquifers may extend across aquifer system boundaries. Regional estimates of aquifer susceptibility to contamination from the surface can differ considerably from local reality. Variations within geologic environments can cause variation in susceptibility to surface contamination. Also, man-made structures such as poorly constructed water wells, unplugged or improperly abandoned wells, and open excavations, can provide contaminant pathways which bypass the naturally protective clays.

### Dissected Till and Residuum Aquifer System

The Dissected Till and Residuum Aquifer system that covers much of the southern and eastern portions of the county has the most limited ground-water resources of the unconsolidated aquifer systems in the county. Total thickness of this system in the county ranges from about 5 to 50 feet. In most of the county the unconsolidated materials of this system consist of thin, eroded high-clay content bedrock residuum commonly less than 15 feet thick. However, in the northwest quarter of the county the system includes some pre-Wisconsin till, lacustrine silt and clay, and Wisconsin loess that contain a thin (commonly less than 5 feet thick) sand layer in a few places.

With the exception of the northwest quarter of the county, this aquifer system has extremely limited potential for successful wells. Yields for domestic wells typically range from 0 to 5 gpm. Dry holes are common. Because of the low permeability of the surface materials, this system is not very susceptible to contamination from surface sources.

### White River and Tributaries Outwash Aquifer System

The White River and Tributaries Outwash Aquifer system is comprised primarily of surficial valley train sand and gravel and occupies the valleys of the White River and its major tributaries. However, in Dubois County this aquifer is limited to the main valley of the East Fork White River. Sand and gravel deposits in this system range from 20 to more than 81 feet thick, but not all are saturated with water. Actual aquifer thickness is about 18 to 64 feet thick. In some areas the water-bearing units are overlain by fine-grained silt, silt, or muddy sand; therefore the aquifer may be confined or unconfined.

Large-diameter, high-capacity wells are expected to yield 300 to 1,000 gpm. This aquifer system is highly susceptible to contamination in areas that lack overlying clay layers. Areas within the system that are overlain by thick layers of clay or silt are moderately susceptible to surface contamination.

### Alluvial, Lacustrine, and Backwater Deposits Aquifer System

The Alluvial, Lacustrine, and Backwater Deposits Aquifer system consists of unconsolidated deposits in valleys tributary to East Fork White River, Patoka River, and Ohio River. Included are deposits in the main valley of Patoka River and deposits occurring over a broad area in northwest Dubois County. The unconsolidated deposits have two sources: alluvium deposited by a stream along with colluvium eroded from valley walls and uplands, and glaciolacustrine deposits formed in bodies of relatively stagnant lake water.

There are areas in this system where the thickness of unconsolidated material exceeds 100 feet, for example in the main Patoka River valley south of Jasper and adjacent to the Buried Valley Aquifer system northwest of Jasper. Very little data are available, but it is expected that wells drilled in these areas may yield sufficient water for domestic needs. Because the Patoka River above Jasper never carried outwash from melting glaciers, it is doubtful that its main valley has potential for much more than domestic wells.

Sand and gravel lenses, where present in this aquifer system, are commonly less than 5 feet thick and are confined within the glaciolacustrine deposits, or are directly overlying bedrock. Yields for domestic wells range from 0 (dry holes) to 60 gpm. Overall, prospects of completing high-capacity wells in this aquifer system are poor. This aquifer system is marked by thick deposits of soft silt and clay that have low susceptibility to surface contamination.

### Buried Valley Aquifer System

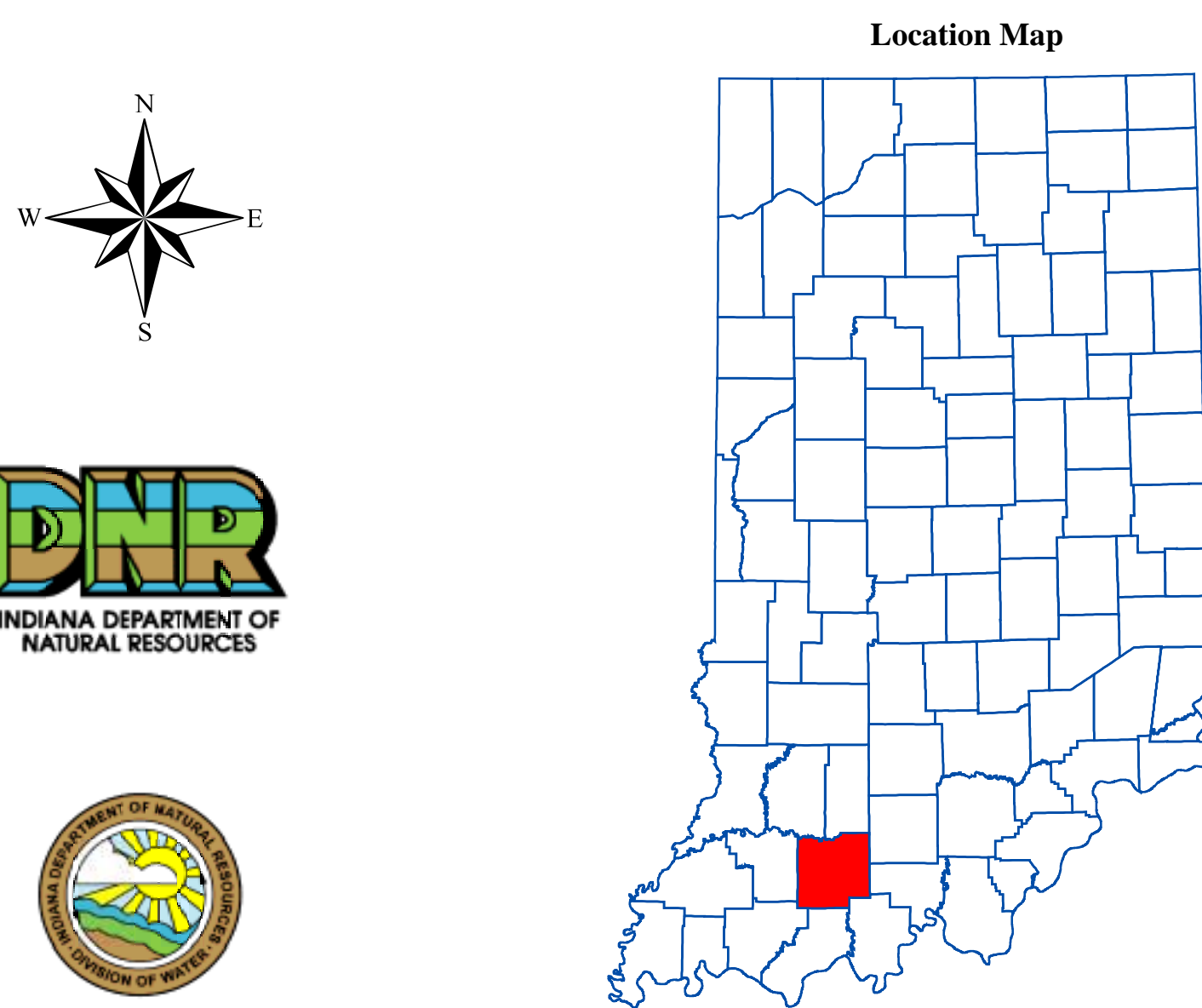
The Buried Valley Aquifer system consists of aquifer materials deposited in pre-glacial bedrock valleys. There is only one significant buried bedrock valley in the county. Domestic wells in this aquifer system typically yield from 5 to 50 gpm. No high-capacity wells are completed in this system and although potential exists for wells yielding up to 200 gpm or more, a major limitation is the fine-grained, dirty nature of the water-bearing sand units occurring in many places.

The Buried Valley Aquifer system has a low susceptibility to surface contamination because tills and lacustrine silts and clays generally overlie outwash sediments occurring within the bedrock valleys. Although lenses of outwash sand and gravel may occur within the tills, the predominance of fine-grained sediments above the bedrock valleys limits the migration of contaminants from surface sources to the deep aquifers.

### Coal Mine Spoil Aquifer System

The Coal Mine Spoil Aquifer system covers a small percentage of Dubois County, primarily because the coal seams in the county are too thin and sporadic to be of great commercial significance. This aquifer system was formed during the surface-mining process. The overburden, most of which was originally solid rock, was typically broken up by blasting and moved aside to uncover the desired coal seam, thus creating a heterogeneous mixture of particles ranging in size from clay, silt, and sand up to gravel, slabs, and boulders. Where extensive, these spoil areas contain considerable amounts of ground water. Although data are lacking on permeability of these spoil materials, it is generally accepted that the spoil permeability is greater than that for most of the original rock layers above the coal seam mined.

The quality of ground water in this system is generally much poorer than that in the overburden before mining took place. Typically a significant increase occurs in total dissolved solids, especially calcium, magnesium, bicarbonate, and sulfate. High iron, and in places low pH, can also severely limit potential uses of ground water from this system. The Division of Water has no records of any water supply wells completed in this aquifer system in Dubois County.



## Map Use and Disclaimer Statement

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This map was created from several existing shapefiles. Surface Coal Mines in Southwestern Indiana (polygon shapefile, 20001207), Township and Range Lines of Indiana (line shapefile, 20020621), Land Survey Lines of Indiana (polygon shapefile, 20020621), and County Boundaries of Indiana (polygon shapefile, 20050621) were all from the Indiana Geological Survey and based on a 1:24,000 scale. City Areas in Southwestern Indiana (polygon shapefile, 1999) was from ESRI and based on a 1:100,000 scale. Streams27 (line shapefile, 20000420) was from the Center for Advanced Applications in GIS at Purdue University. Unconsolidated Aquifer Systems coverage (Grove and Herring, 2003) was based on a 1:24,000 scale work maps.

## Unconsolidated Aquifer Systems of Dubois County, Indiana

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